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ABSTRACT

This report deals with problems of keeping the documents in the Russian state library tied up with their storage condition. Cited are results of the observation of temperature, humidity, sanitary, hygienic, and light conditions of storage in depositories with unregulated climate. The report shows the stabilization and research of documents carried on by the research center of conservation of documents of the Russian state library to be insufficient for rehabilitating the documents which are constantly deteriorating under the influence of the environment in old depositories with unregulated climate. Reconstruction of the library's main depository of 19 tiers has begun. The report considers the difference between old depositories and those under reconstruction. The impact of the environment on the preservation of materials is analyzed. (Author/MES)

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Conditions of storing the documents as the chief means of preserving the library holdings (As shown by the experience of the Russian state library)

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Abstract

The report deals with problems of keeping the documents by the Russian state library tied up with their storage conditions. Cited are results of the observation of temperature, humidity, sanitary, hygienic, light conditions of storage in depositories with unregulated climate. The report shows the stabilization and research of documents carried on by the research centre of conservation of documents of the Russian state library to be insufficient for rehabilitating the documents which are constantly deteriorating under the influence of the environment in old depositories with unregulated climate. Now the reconstruction of the library's main depository of 19 tiers has begun which the French firm «Cunin S.A. Contrexeville» is in charge of. The report dwells upon the differences between old depositories and those under reconstruction. The impact of the environment on the preservation of materials which from the basis of library documents is analyzed.

Paper

Being the national book depository, the Russian state library possesses holdings of books, manuscripts, periodicals, maps, posters and other printed matters running to over 40 million. It is one of the greatest book depositories of the world. In compliance with its social and cultural mission the Russian state library keeps and places at readers' disposal collections of Russian and foreign printed publications, handwritten and other documents on multifarious kinds of information carriers.

The assurance of the preservation of the stocks is one of the main responsibilities of the library, which is a guarantee of the discharging of the remaining functions.

The Russian state library disposes over collections of books and journals, newspapers and maps, art prints, photographs and phonodocuments, microfilms, theses, handwritten books, unpublished documents on culture and arts, which are unique in terms of their completeness and contents. Being the national library bears responsibility for the serration of this wealth to the entire world community. Several al million items kept in the stocks of the RSL are ready in decrepit condition, tens of thousands have been lost in the act of storage and use. In this connection the assurance of the preservation of the stocks gains in importance in the activities of the library.

The solution of the task of the assurance of the physical preservation of documents in the RSL rests upon the present - day concept of national sciences relative to the preservation of documents, which takes account of the factors determining the terms of the preservation of documents.

The storage conditions are of large importance for the preservation of library holdings. The storage conditions being critical, even publications on durable paper cannot maintain stability.

The assurance of the physical preservation of library documents and prevention of their premature ageing under the impact of environmental factors is possible only in case of observing the stable conditions in depositories. A complex of such conditions as standards of location of the stacks, their use and transportation, demands relative to the equipment of depositories and the sanitary and hygienic state of library premises is meant by the storage conditions. Demands relative to the storage conditions are determined, substantiated and published in standard documents.

Observing the storage conditions in the libraries implies the highest possible cutting down of the impact of all factors badly influencing the materials of the documents. Such as fluctuation of temperature and humidity, ultraviolet irradiation, presence of diverse chemical dirt and dust in the air of book repositories and existence of biological vermin: insects, microorganisms and rodents at the same place. The character of the shelving of stocks, the location of the shelves, the system of air circulation in the depository affect the preservation of library materials. Any deviation from the norm no matter how infinitesimal it may be can recoil on the physical state of the holdings and become apparent in the shape of mechanical damage of documents (as shown in figure 1). Distinct enough as the demands relative to the storage conditions are nowadays, they are unsatisfactory in virtually all depositories of the RSL (as shown in figure 2) with the root cause lying in the difficulty of the technical assurance of the best storage conditions and, what is anything but less important, in the complicacy of the differentiated approach towards keeping documents with different warp, physical state, degree of value and so on.

Poor technical state of the depositories of the holdings of the Russian state library tends to bring on accidentals in them. Causes of that are greatly variegated. Wrecks of heating and water supply systems, leaks in the roofing, checking up the drains and others can be held up as examples. Old-time precious books have been exposed to becoming wet , warm, being affected by microscopic fungi for years on end.

Most depositories are housed in premises with unregulated climate, where outside air, room air and the stocks kept interact as the natural result. The manuscript department always under intent surveillance on the part of specialists can be held up as an example in the RSL. Its premises have been meant for or adjusted to the storage. The system of indraught and escape ventilation is absent to date there. For the last eight years the temperature in the cold season has been ranging between 25 and 28 degrees centigrade and sometimes from 30 to 39 degree centigrade in the depositories of handwritten documents which has led to pronounced warp of

inner blocks and bindings. In 1998 the temperature and moisture conditions changed for the better in the manuscript depository, but it was still by no means up to the mark. The situation of the depository of microfilms is on the verge of disaster and is deserving special attention (as shown in figure 3), where fluctuations of temperature and moisture keep bringing about the inception of microscopic fungi on films. Luckily sharp seasonal change of moisture and temperature has brought on the loss of their viability. Things have not settled to this day since the conditions in the depository are such as to be liable to give rise to an outburst of the development of microscopic fungi at any time.

Materials of the documents, air in the premises and in the environment are open systems and over their bounds constant air circulation is going on. The regime of these three systems is continually changing dependent on the airtightness of edifices, the operation of air conditioners or indraught and escape ventilation, the measure of load on the depository, the system of location of the stocks. As a rule, both temperature and humidity in unheated and non-airproof of premises comply with those of the tract where they are found (as shown in figure 4). Steady penetration of outside air into premises with irregularly changing water steam and localization of the heat regime in the range of positive temperature is as ever characteristic of heated buildings with airproof premises. This brings about peculiar climatic conditions in heat premises. Changes of the atmosphere humidity in premises are bound up with the changes of the humidity of outside air, but this comes about with some delay (as shown in figure 5) These changes are directly dependent on the airtightness of the edifice.

The materials of the library stocks are hydrophilic and so they have a part in the process of moisture circulation. Depending on it the moisture content changes. The more airproof the premise, the lower the moisture of the materials kept other things being equal.

The longevity of materials depends on the presence of moisture in them. The content of moisture is to be within the limits of the norm in that both surplus and lack make for speeding up the natural ageing.

The state of moisture of documents depends on the dimensions and the thickness of documents and of the container where they are kept either. The increase of the thickness of the documents kept brings the decrease in the factual content of moisture, the slowing down of the reaction on sharp fluctuations of the outside climate in its train.

Furthermore, the presence of windows, their type, dimensions and orientation determine the change of the climate. Besides the heating and ventilation systems, dimensions of load on the depository, its location various storeys, the frequency of visits by attendants are of much consequence.

Frequent fluctuations of temperature and moisture are indicative of premises with unregulated climate owing to which physical and mechanical properties of materials vastly deteriorate. As a rule, such fluctuations exceed the limits of the storage conditions which are permissible according to the standards and safe for preserving the materials of the documents (as shown in figure 6).

Materials most heavily change at the peak values of humidity, whereas the durability properties recover in case of consequently being kept under normal conditions. However if sharp fluctuations of moisture occur often or if the materials are kept under these conditions for a long time irreversible changes are likely to ensue.

The temperature factor is of no less significance for the preservation and is greatly dependent on the moisture characteristics. The probability of chemical processes grows according to the rise of the moisture of materials particularly in case of the growth of the temperature of the environment since molecules of water exist in chemically active state in paper, leather and other library materials at the temperature of over 25 degrees centigrade. When the temperature is lower, the molecules of water remain inert, but there still is danger of the biological damage

to documents. Control of the temperature and moisture conditions in the depositories of the RSL from June 1996 to November 1998 shows the relative air moisture to fluctuate within the limits of the standard, to wit 50 to 60 cent on all tiers of the chief depository in the departments of rare books, literature of Russian exiles, printed music, art prints, maps in the span of time from June to November (the microfilm depository, where the relative moisture reaches up to 90 to 92 per cent and the map department and the department of printed music, where moisture amounts for 70 per cent in the summer time are exceptions). In the cold season moisture in the depositories is 10 to 20 per cent below the norm. However, in the summer time the temperature is as high as 30 degrees in some depositories. Sudden overfalls of temperature and moisture are to be observed at the turn of seasons and notably at the start and the end of the cold season.

Glare is another factor of adverse impact on the documents. The destructive influence of ultraviolet rays on documents is particularly essential at 300 to 500 N.M. The ultraviolet irradiation triggers off processes of hydrolysis and oxidizing destruction of main components of library materials collagen (leather) and cellulose (paper). Solar and day light in a large measure consists of rays of this section of this spectrum. Thus the storage of documents in the dark and the paying of special attention to the conditions of exposition of document at exhibitions are preferable. The intensity of the light in the depositories of the RSL practically on all tiers exceeds the standard established for the spring and summer. Lack of plafonds on the daylight lamps very unfavourably tells on the preservation of books.

Air in depositories contains multifarious admixtures for from being safe for materials of library documents. The nature of dirt depends both on the location of buildings, their architectural peculiarities and on the presence and kind of ventilation or air conditioning there. Sulphur and nitrogen oxides pollute the atmosphere of the solar glare nitrogen oxides and hydrocarbons from such new combinations as ozone and peroxiacetylnitrate, each of them being a strong destructive agent for materials of library documents. Gaseous substances: ozone, peroxiacetylnitrate, steam of nitric acid, hydrogen chloride, carbonic combinations, carbonic acids, hydrogen sulphide, sulphur dioxide; solid substances: particles, street dust, rubber particles, mineral salts (sulphates, nitrates and others) soot, diverse organic substances, aerosols (transition from gas to particles) and so on.

The destructive impact of gaseous dirt in air, penetrating into buildings from the outside, on materials has been amply studied. Such dirt capable of reaction as ozone , sulphur and nitrogen oxides are known to penetrate into buildings to 80 per cent and more since filters catch them badly.

Of gaseous air dirt generated inside libraries and museums aldehydes and organic acids especially formaldehyde, acetaldehyde, formic acid, acetic acid(these combinations have been detected in the air of the RSL depositories) are most perilous, being able to exude into air in the act of degradation of materials containing cellulose.

Thick layer of dust exerts destructive influence too, dust particles are not inert they contain active centres which intensely absorb, further stronger grinding down of documents and bring bacteria and spores of mould fungi, promoting their development and accumulation on documents.

It is known that only such large particles as combinations of aluminium, silicon, titanium, manganese, iron can be effectively held up with the aid of mechanical filters. Particles of medium dimensions, for instance, ammonium nitrate, carbonates of alkaline earth metals yield to this worse. Small particles (0,1 to 1,0 mkm in diameter) are held up only to one per cent. Soot, aerosols belong here. On the when particles being 0,1 mkm and less in diameter often happen to be of acidic origin and so they make various materials disintegrate.

Furthermore people bring dust of different origin into buildings and various materials generate it.

There fore when analyzing the ecological situation in depositories one must bear in mind not only total amount of dust in the air, but the concentration of particles differing in dimensions. Dust makes wood, vegetable and animal fibres decay. The process of destruction proceeds utterly slowly and so it is inconspicuous.

An analysis of the air in the RSL depositories has shown the amount of dust to differ vastly in various depositories. It has been ascertained that dust samples are a medley of fibres and powdery particles of different size and shape. The bulk of dust fibres are 1 to 5 mm long and 10 to 60 mkm thick. In the course of examination of dust samples by means of the roentgen spectral analysis it has been found out that the following elements are present there: Si - 30 per cent, Fe - 15 per cent, Ca - 30 per cent, Al - 5 per cent, S - 15 per cent, K - 5 per cent.

Continuous disastrous leaks on tiers cause the plaster on the ceiling and walls to fall off. An appreciable amount of dust forms in consequence of grinding down the materials of documents as a result of work with them on the part of keepers of stocks.. For this reason special attention is to be paid to such factor of preservation as the use of holdings.

Rare and careful use does little harm to books. However libraries are no museums and so one has harder time talking about cutting down the use of stocks, but when monuments come up for discussion one ought to have this in mind and endecwour to issue readers copies and not originals of documents. The state of our stocks is deteriorating with every passing day. In analyzing the data from investigations conducted by the control group only for last year we have come round to the conclusion that we must relinquish the practice of using various premises (often basements and semibasements) for depositories, which simply do not lend themselves to it. Received from the state according to the residual principle they entail the electronic destruction of the stocks. It is necessary to provide for the assurance of all parameters of the storage conditions as early as the designing stage and the putting up of buildings for libraries. On the same lap the study of materials fitting for the construction of buildings for depositories and the trimming of internal premises is to be carried out.

Thus while analyzing the components of the conditions of conservation of stocks one may again emphasize that the preservation of a document begins with its storage that all links of this complex chain are significant. Observing merely one parameter without satisfactorily maintaining the rest will never warrant the solution of this problem.

Realising this the leadership of the library supported by the Russian government has started the reconstruction of the principal depository of the RSL employing the French firm «Cunin S.A. Contrexeville» with experience of work in the Bibliotheque Nationale de France and in many other depositories. The project of the reconstruction of the depository has been conceived in consideration of the above. To enlarge on this project will take the time needed for one the report. It is only to be noted that the storage conditions in this depository come up to international standards and we hope that the problem of the storage conditions in the RSL will be partly solved by putting this depository into operation.

All in all the assurance of the lasting preservation of library holdings is not only duty of keepers and restorers but joint activity of specialists in technology of paper production and publication of printed matters, librarians and savants, chemists, biologists, specialists in library science, specialists in computer technologies and production of diverse microcopies and finally, simply users-readers. Going alone, no one will cope with the problem.

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